

# CWRA+ at IMSA

Robert Hernandez, Ed.D.

Principal

Amber Stitzel Pareja, Ph.D.

Executive Director, Office of Institutional Research

# Why CWRA+?

- Measures critical thinking skills
  - Real-world, problem-solving performance tasks
- Enables IMSA to better understand how well students are learning critical-thinking skills
  - Provides snapshot of proficiency, growth, and program efficacy
- No Ceiling Effect
  - Scores range from ~400 to ~1600
    - Maximum IMSA student score = 1545 (sophomore) & 1550 (senior)
  - Only around 1/4 of IMSA students have reached Advanced level by senior year

# CWRA+ Testing Schedule

- Fall of 2011 – Spring of 2017
  - Two times
    - Fall of sophomore year & Spring of senior year
- Fall of 2017 – Spring of 2019
  - Four times
    - Fall of sophomore year & Spring of sophomore, junior, and senior years
- Fall of 2019 – Forward
  - Three times
    - Fall of sophomore year & Winter of junior and senior years

# CWRA+ Components

- Performance Task – Requires students to utilize critical-thinking skills
  - Analysis and Problem Solving
  - Writing Effectiveness
  - Writing Mechanics
- Selected-Response Questions – Requires students to apply critical-thinking skills
  - Scientific and Quantitative
  - Critical Reading and Evaluation
  - Critiquing an Argument

# Sample CWRA+ Performance Task: Parks

## PERFORMANCE TASK: PARKS

### INSTRUCTIONS

This is an example of a CWRA+ Performance Task (PT). In the course of this practice PT, you will prepare a written response to a hypothetical but realistic situation. The PT is made up of an introductory scenario, a question, and six documents/information sources. You will use information from the Document Library in carrying out the task.

While your personal values and experiences are important, you should base your response solely on the evidence provided in the Document Library.

### SCENARIO

Tiverton is a large city located near a national forest. The city currently funds two programs for middle school students. One program, Forest Adventures, is a summer camping program. The other program, Sports & School Experience, combines academic tutoring and sports activities.

Tiverton can no longer afford to fund both programs at their current levels. At tonight's City Council meeting, the council members are going to discuss whether the city should fund only one program. You work for the city manager of Tiverton, Christine Dillingham, and she has asked you to help prepare for the meeting by reviewing the documents provided in the Document Library. **Your final task will be to write a report for Ms. Dillingham that analyzes the two programs and makes a recommendation about how the city should fund the middle school programs.** You have 60 minutes to complete this entire task.

### PROMPT

Your task is to write a report for Ms. Dillingham that analyzes the two programs and answers the question, "If Tiverton cannot afford to fund the Forest Adventures and the Sports & School Experience programs at their current levels, what should the city do?" You could recommend funding only one program, modifying the program(s), or something else. In your report, support your recommendation with information found in the Document Library and explain why other possible recommendations are not as good.

While your personal values and experiences are important, please answer the question in this task solely on the basis of the information provided above and in the Document Library.

# Sample CWRA+ Scientific & Quantitative Reasoning

## DOCUMENT : SCIENTIFIC & QUANTITATIVE REASONING

### Fueling the Future

In a quest to solve the energy problems of the twenty-first century—that is, to find sustainable and renewable sources of energy that are less destructive to the environment yet economical enough to have mass appeal—scientists throughout the world are experimenting with innovative forms of fuel production. While oil is still the most common source of fuel, there is a finite amount of it, and new alternatives will become necessary to sustain the supply of energy that we are accustomed to.

Corn-based ethanol, the most common alternative to traditional fossil fuels (primarily coal, petroleum, and natural gas), is mixed into gasoline in small quantities, and it now accounts for about 10% of the fuel supply from sources within the United States. Because corn is grown on farmland, it is subject to price fluctuations based on supply and demand of the crop, as well as disruptions resulting from naturally occurring events, such as droughts and floods. At present, nearly 40% of the corn grown in the United States is used for fuel, and the demand for corn-based ethanol is rising. To meet this demand, wetlands, grasslands, and forests are all being converted into farmland with the sole intention of growing corn for more ethanol production. Corn grown for ethanol has become a more valuable commodity for farmers than crops grown for food, and this has negatively affected consumers worldwide, as shown by the increasing price of food over time.

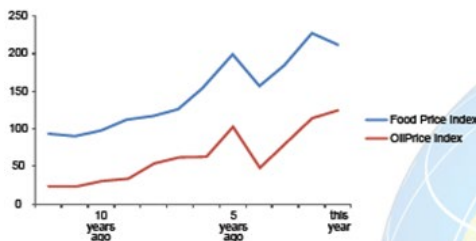


Figure 1: Food and oil price indices (based on information found at [www.fao.org](http://www.fao.org) and [www.indexmundi.com](http://www.indexmundi.com))

Another alternative that has gained attention in recent years is the harvesting of biofuel from algae. Biodiesel, a type of biofuel, is produced by extracting oil from algae, much like the process involved in creating vegetable oils from corn or soybeans. Ethanol can also be created by fermenting algae. Algae biofuel has some unique benefits that separate it from other fossil fuel alternatives. To begin with, while all fuels create

carbon dioxide when they are burned, algae have the ability to recapture and use that carbon dioxide during photosynthesis while they are growing. In this regard, the advantage is enormous. The process of growing algae actually absorbs more carbon dioxide than is released into the atmosphere when it is burned for fuel. Most manufacturing processes strive for “carbon neutrality”—or the balance between carbon emissions and depletion corresponding to a net carbon output of zero. Even better, algae-based biofuel can be described as “carbon negative.” Other forms of biofuel can make similar claims. For example, ethanol from corn also eliminates carbon dioxide in the atmosphere through photosynthesis. Unlike corn, however, algae grow in water, usually in man-made ponds built on land not used for crops. Additionally, algae do not require fresh water. Instead algae can be grown in salt water, and, in some cases, even sewage water and other waste material.

The most promising aspect of algae biofuel stems from its yield. When compared to other biofuel producers, algae’s fuel yield per harvested acre is over 500 times greater than that of corn.

The following chart compares commonly used biofuel crops on several important factors.

Table 1: Comparison of biofuel crops (based on information found at [algaefuel.org](http://algaefuel.org) and [ciga.org/wpengine/ndms-cdn.com](http://ciga.org/wpengine/ndms-cdn.com))

Product	Oil Yield Gallons/Acre	Harmful Gas Emissions	Use of Water to Grow Crop	Fertilizer Needed to Grow Crop	Energy Used to Extract Fuel from Crop
Ethanol from Corn	18	high	high	high	high
Biodiesel from Soybeans	48	high	high	low-medium	medium-low
Biodiesel from Canola	127	medium	high	medium	medium-low
Biodiesel from Algae	10,000	negative	medium	low	high

## QUESTIONS: SCIENTIFIC AND QUANTITATIVE REASONING

- Which of the following negatively affects algae biofuel’s ability to be a “carbon-negative” energy source?
  - It takes 3000 liters of water to create one liter of biofuel from algae, which is highly inefficient and wasteful of resources.
  - The process of extracting biofuel from algae requires more energy than is generated by burning the biofuel itself.
  - The construction of facilities needed to extract algae biofuel would initially require the use of fossil fuels for energy.
  - Algae biofuel is about 25 years away from being commercially viable, by which point there will be more efficient alternative energy sources.
- The graph shows that food and oil prices increase and decrease together. Which of the following is the most plausible explanation for this phenomenon?
  - As the price of food increases due to supply and demand, the cost of oil also rises because less land is available for planting corn.
  - Food and oil suppliers dictate the prices of their goods. Therefore, the prices of food and oil rise as consumers can afford to pay more for commodities.
  - The prices of oil and food are simultaneously affected by global conditions, such as natural disasters, weather, famine, and political unrest.
  - Farmers plant more corn for ethanol when the price of oil increases. The price of food then rises because less food-yielding crops are being produced.
- What additional information could be added to the table for evaluating the efficiency and viability of algae biofuel compared to other sources of biofuel?
  - The average amount of money farmers earn per acre for each biofuel source.
  - The costs associated with the extraction of energy from each biofuel source.
  - The taxes collected by the government on the sale of each biofuel crop.
  - The level of financial support each type of biofuel has received from investors.
- Which of the following could plausibly occur if algae become a highly efficient and cost-effective source of biofuel?
  - The price of food would fall because more farmland could be used to produce food rather than corn harvested for ethanol.
  - The supply of fresh water would be reduced because of the demands of harvesting algae for biofuel.
  - The cost of fuel would rise as the world’s markets become flooded with alternative sources of energy.
  - The amount of carbon in the air would increase because more fuel will be burned due to lower costs.



# Significant Growth on CWRA+

**Significant Growth Goal** → Increase 10% or More of Total Possible Points between Sophomore and Senior Years

- Significant Growth Goal =  $(1600 - \text{Sophomore Score Total}) * .10$
- Score Difference = Senior Total Score – Sophomore Total Score

**If Score Difference  $\geq$  Significant Growth Goal**

- Student showed **significant growth** while at IMSA

# Advanced Level on CWRA+

- **Advanced Level Goal** → % of students who score at the **Advanced** mastery level by senior year

## *Five Levels of Mastery*

Level	% of Private School Seniors (2017-2018)
Below Basic	1
Basic	18
Proficient	22
Accomplished	48
Advanced	11



# Discussion

- Discuss and share your thoughts regarding the recent administrations of the CWRA+
- What recommendations do you have regarding implementing the CWRA+ at IMSA?